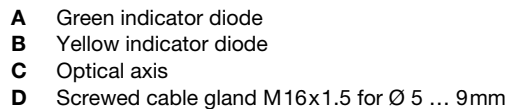


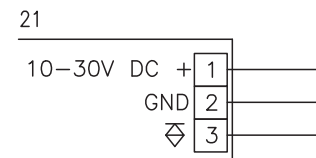
## Protective throughbeam photoelectric sensors



- ## Electrical connection



## Receiver



- Mounting systems  
(BT 96, BT 96..., UMS 96, BT 450....-96)
- Alignment aid ARH 96
- Test-monitoring units:
  - MSI-TR1B-01 (Part no. 547958)
  - MSI-TR1B-02 (Part no. 547959)

## Specifications

### Safety-relevant data

Type in accordance with IEC/EN 61496  
Performance Level (PL) in accordance with ISO 13849-1 <sup>1)</sup>  
Category in accordance with ISO 13849 <sup>1)</sup>  
Mean time to dangerous failure (MTTFd)  
Service life (TM)

### Infrared light

type 2  
PL c  
cat. 2  
400 years  
20 years

### Optical data

Typ. operating range limit <sup>2)</sup>  
Operating range <sup>3)</sup>  
Light source  
Wavelength

0 ... 65m  
0 ... 50m  
LED (modulated light)  
880nm

### Timing

Sensor switching frequency  
Sensor response time  
Delay before start-up

500Hz  
1 ms  
≤ 200ms

### Electrical data

Operating voltage  $U_B$   
Residual ripple  
Open-circuit current  
Switching output  
Function  
Signal voltage high/low  
Output current

10 ... 30VDC (incl. residual ripple)  
≤ 15% of  $U_B$   
≤ 50mA  
PNP transistor  
light switching  
≥ ( $U_B - 2V$ )/≤ 2V  
max. 100mA

### Indicators

Green LED

ready

### Receiver

Yellow LED

light path free

Yellow LED, flashing

light path free, no performance reserve

### Transmitter

Yellow LED

transmitter active

### Mechanical data

Housing  
Optics cover  
Weight  
Connection type  
Screwed cable gland

### Metal housing

diecast zinc  
polycarbonate  
380g  
terminals, cable diameter 5 ... 9mm  
EEx e II clamping torque 3.5Nm

### Environmental data

Ambient temp. (operation/storage)  
Protective circuit <sup>4)</sup>  
VDE safety class <sup>5)</sup>  
Protection class  
Light source  
Standards applied

-20°C ... +50°C/-40°C ... +55°C  
1, 2, 3  
II, all-insulated  
IP 67, IP 69K <sup>6)</sup>  
exempt group (in acc. with EN 62471)  
IEC 60947-5-2

### Explosion protection

Certification (CENELEC)

 II 3G Ex nA op is IIB T4 Gc X

 II 3D Ex tc IIIC T70°C Dc IP67 X

### Options

Activation input activ

Transmitter active/not active

Activation/disable delay

Input resistance

≥ 8V/≤ 2V

≤ 1ms

10KΩ ± 10%

1) In combination with a suitable test monitoring unit, e.g. MSI-TR1B-0x

2) Typ. operating range limit: max. attainable range without performance reserve

3) Operating range: recommended range with performance reserve

4) 1=transient protection, 2=polarity reversal protection, 3=short circuit protection for all outputs

5) Rating voltage 250VAC / Overvoltage category II


6) IP 69K test acc. to DIN 40050 part 9 simulated, high pressure cleaning conditions without the use of additives, acids and bases are not part of the test

## Tables

### Infrared light

0	50	65
---	----	----

 Operating range [m]

 Typ. operating range limit [m]

## Diagrams

## Remarks

## Order guide

	Designation	Part no.
<b>Transmitter and receiver</b>	<b>SLS 96M/P-1079-T2-2 Ex n</b>	
Transmitter	SLSS 96 M-1089-T2-24 Ex n	50111085
Receiver	SLSE 96 M/P-1079-T2-21 Ex n	50111086

## SLS 96 Ex n

## Protective throughbeam photoelectric sensors

### Notices for the safe use of sensors in potentially explosive areas

This document is valid for devices with the following classifications:

Device group	Device category	Equipment protection level	Zone
II	3G	Gc	Zone 2
II	3D	Dc	Zone 22



#### Attention!

- Check whether the equipment classification corresponds to the requirements of the application.
- A safe operation is only possible if the equipment is used properly and for its intended purpose.
- Electrical equipment may endanger humans and (where applicable) animal health, and may threaten the safety of goods if used incorrectly or under unfavorable conditions in potentially explosive areas.
- The applicable national regulations (e.g. EN 60079-14) for the configuration and installation of explosion-proof systems must be observed without fail.

### Installation and Commissioning

- The devices must only be installed and commissioned by trained electricians. They must be aware of the regulations and operation of explosion-proof equipment.
- To prevent unintentional separation under voltage, devices with connector (e.g. Series 46B) must be equipped with a safeguard or a mechanical interlocking guard (e.g. K-VM12-Ex, part no. 50109217). The warning sign "Do not disconnect under voltage" that is supplied with the device must be attached to the sensor or its mounting bracket so that it is clearly visible.
- Devices with terminal compartment lid (e.g. Series 96) must only be commissioned if the terminal compartment lid of the device is properly sealed.
- Connection cables and connectors must be protected from excessive or unintended pulling or pushing strain.
- Prevent dust deposits from forming on the devices.
- Metallic parts (e.g. housing, mounting devices) are to be integrated into the potential equalization to prevent electrostatic charge.

### Maintenance

- No changes may be made to explosion-proof devices.
- Repairs may only be performed by a person trained for such work or by the manufacturer.
- Defective devices must be replaced immediately.
- Cyclical maintenance is generally not necessary.
- Depending on the environmental conditions, it may occasionally be necessary to clean the optical surfaces of the sensors. This cleaning must only be performed by persons trained for this task. We recommend using a soft, damp cloth. Cleaning agents that contain solvents must not be used.

### Chemical resistance

- The sensors demonstrate good resistance against diluted (weak) acids and bases.
- Exposure to organic solvents is possible only under certain circumstances and only for short periods of time.
- Resistance to chemicals must be examined on a case by case basis.

### Special conditions

- The devices must be installed in such a way that they are protected from direct exposure to UV rays (sunlight).
- Static charge on plastic surfaces must be avoided.

## Safety notices

Before using the safety sensor, a risk evaluation must be performed according to valid standards. For mounting, operation and tests, this document as well as all applicable national and international standards and regulations must be observed, printed out and handed to the affected personnel.

Before working with the safety sensor, completely read and observe the documents applicable to your task.

In particular, the following national and international legal regulations apply for the commissioning, technical inspections and work with safety sensors:

- Machinery directive 2006/42/EC
- Use of Work Equipment Directive
- Accident-prevention regulations and safety rules
- Other relevant standards
- Standards, e.g. ISO 13855

### Symbols



#### Attention!

Warning sign – This symbol indicates possible dangers. Please pay especially close attention to these instructions!



These symbols identify the transmitter.



These symbols identify the receiver.

### Safety sensor area of application

The protective throughbeam photoelectric sensor is an active optoelectronic protective device only in connection with a safety-relevant control system, in which the cyclical testing of transmitter and receiver is carried out in accordance with EN 61496-1, up to category 2 and PL c in accordance with EN ISO 13849-1.



#### Attention!

- The safety sensor protects persons at access points or at points of operation of machines and plants.
- The safety sensor only detects persons upon entry to the danger area; it does not detect persons who are located within the danger area. For this reason, a start-up/restart interlock is mandatory.
- No protective function without adequate safety distance.
- The power supply unit used to operate the photoelectric sensor has to be able to compensate for changes and interruptions of the supply voltage acc. to EN 61496-1.
- Also observe the safety notices in the documentation of the connected test device!
- Additional measures must be taken to ensure that the AOPD does not experience a dangerous failure due to glare from other light sources.

### Proper use

The safety sensor must only be used after it has been selected in accordance with the respectively valid instructions and relevant standards, rules and regulations regarding occupational safety and safety at work, and after it has been installed on the machine, connected, commissioned, and checked by a competent person.

### Foreseeable misuse

Any use other than that defined under the "Proper use" or which goes beyond that use is considered improper use. The user must ensure that no optical influence on the AOPD occurs through other forms of light beams, e.g. through

- wireless control devices on cranes,
- radiation from welding sparks,
- stroboscopic lights.

### Competent personnel

Prerequisites for competent personnel:

- He has a suitable technical education.
- He knows the instructions for the safety sensor and the machine.
- He has been instructed by the responsible person on the mounting and operation of the machine and of the safety sensor.

## SLS 96 Ex n

## Protective throughbeam photoelectric sensors

### Responsibility for safety

Manufacturer and operator must ensure that the machine and implemented safety sensor function properly and that all affected persons are adequately informed and trained.

The **manufacturer** of the machine is responsible for:

- Safe implementation of the safety sensor.
- Imparting all relevant information to the operator.
- Adhering to all regulations and directives for the safe commissioning of the machine.

The **operator** of the machine is responsible for:

- Instructing the operating personnel.
- Maintaining the safe operation of the machine.
- Adhering to all regulations and directives for occupational safety and safety at work.
- Regular testing by competent personnel.

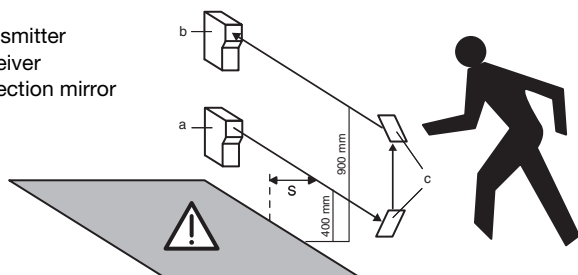
### Safety distances



#### Attention!

The protective throughbeam photoelectric sensor must be installed with the correctly calculated safety distance as well as suitable beam distances from a potentially dangerous motion: if an interruption of the light beam occurs, the danger area may only be reached once the machine has already come to a dead stop.

- a Transmitter  
b Receiver  
c Deflection mirror



**Beam distances in accordance with ISO 13855**

Number of beams	Heights above reference plane, e.g. floor [mm]	Additional distance C [mm]
1	750	1200
2	400, 900	850
3	300, 700, 1100	850
4	300, 600, 900, 1200	850

The safety distance **S** between photoelectric sensor and danger area is calculated using the following formula (ISO 13855):

$$S = (K \cdot T) + C$$

**S:** Safety distance [mm] between photoelectric sensor and danger area.

**K:** Approach speed (constant = 1600 mm/s).

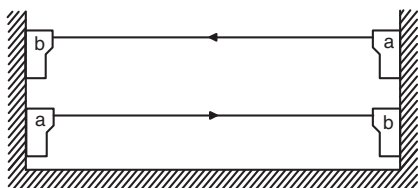
**T:** Time delay [s] between interruption of the light beam and stand-still of the machine.

**C:** Safety constant (additional distance) = 850mm or 1200mm, see table above.

### Multi-axis arrangement

With multi-axis installation the light beams have to run parallel to the reference plane (e.g. floor) and must be aligned mutually parallel.

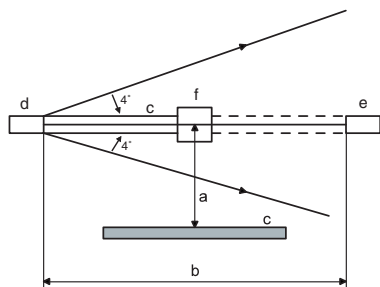
For this the beam direction must be set oppositely in each case. Otherwise the light beams could cause mutual interference and disturb proper functioning.



- a Transmitter  
b Receiver

### Distance to reflecting surfaces

When mounting, a sufficiently large distance from the optical axis to reflecting surfaces must be selected.



- a Distance to the reflecting surface  
b Protected field width  
c Reflecting surface  
d Transmitter  
e Receiver  
f Object

## Commissioning

### Alignment of the sensors

- Mount photoelectric sensors with corresponding fixing brackets from Leuze electronic.
- Apply operating voltage to transmitter and receiver and activate transmitter via activation input (see "Electrical connection").
- Green LEDs on transmitter and receiver and yellow LED on transmitter illuminate.
- Position receiver until the yellow LED illuminates.

Receiver LED blinks yellow: Light path free, but no performance reserve; clean and readjust photoelectric sensor, or check operating conditions.

### Safety notices for test function

1. To perform testing correctly the activation input of the SLS 96 transmitter must be connected to a test monitoring unit.
2. The test duration during access protection must not exceed 150ms.
3. Subsequent to sensor activation the output switching elements of the test monitoring unit must remain in the 'off' state for at least 80ms so that the downstream equipment can be switched off safely when the photoelectric sensor is used for access protection.
4. In order to comply with points 2 and 3, the use of Leuze electronic test monitoring units (MSI-TR1B-01, MSI-TR1B-02) is recommended.

## Test

The checks should ensure that the Optoelectronic Protective Devices have been used acc. to the national/international regulations, in particular in accordance with the machine and work-equipment directive.

### Check before initial commissioning

- Observe the nationally and internationally valid regulations.
- Is the required safety distance (protective field of the safety sensor to the next point of operation) maintained?
- Is the safety sensor effective during the entire dangerous movement and in all adjustable operating modes of the machine?
- It must not be possible to climb over, climb under or circumvent the light path.
- Ensure that the sensor only detects persons upon entry to the danger area and does not detect whether persons are located within the danger area.
- Is a start-up/restart interlock present?
- Before they begin work, have a competent person train the operating personnel in their respective tasks.

### Regular testing by competent personnel

The reliable interaction of safety sensor and machine must be periodically tested in order to detect changes to the machine or impermissible tampering with the safety sensor.

- Have all tests performed by competent personnel.
- Observe the nationally and internationally applicable regulations and the time periods specified therein.

### Daily check of the effectiveness of the safety sensor

It is extremely important to examine the effectiveness of the protective field daily so that it is ensured that e.g. even with adjustments to e.g. parameters, the protective function is active at all points.

Interrupt the light beam between the transmitter and receiver (test rod Ø 30mm)

- in front of the transmitter.
- in the middle between the transmitter and receiver.
- in front of and behind the deflection mirror.

It must not be possible to initiate the dangerous state during beam interruption.

## Disposal

For disposal observe the applicable national regulations regarding electronic components.


the **sensor** people

**EG-KONFORMITÄTS-  
ERKLÄRUNG**
**EC DECLARATION  
OF CONFORMITY**
**DECLARATION CE  
DE CONFORMITE**

Der Hersteller

The Manufacturer

Le constructeur

**Leuze electronic GmbH + Co. KG**  
In der Braike 1, PO Box 1111  
73277 Owen, Germany

erklärt, dass die nachfolgend  
aufgeführten Produkte den  
entsprechenden Anforderungen  
der genannten EG-Richtlinien  
und Normen entsprechen.

declares that the following  
listed products fulfil the  
relevant provisions of the  
mentioned EC Directives and  
standards.

déclare que les produits  
identifiés suivants sont  
conformes aux directives CE  
et normes mentionnées.

Produktbeschreibung:

Description of product:

Description de produit:

**Einweg Sicherheits  
Lichtschranke  
SLS 96M/P-1079-T2-2 Ex n**


**Protective troughbeam  
photoelectric sensor  
SLS 96M/P-1079-T2-2 Ex n**

**Barrières unidirectionnelles de  
sécurité  
SLS 96M/P-1079-t2-2 Ex n**

Kennzeichnung Gas / Staub:

Marking for gas / dust:

Marquage gaz / poussière:

 II 3G Ex nA op is IIB T4 Gc X

/

 II 3G Ex tc IIIC T70°C Dc IP67 X

Angewandte EG-Richtlinie(n):

Applied EC Directive(s):

Directive(s) CE appliquées:

**94/9/EG  
2004/108/EG**

**94/9/EC  
2004/108/EC**

**94/9/CE  
2004/108/CE**

Angewandte Normen:

Applied standards:

Normes appliquées:

10.9.2014  
Datum / Date / Date

  
Ulrich Balbach, Geschäftsführer / Managing Director / Gérant

Leuze electronic GmbH + Co. KG  
In der Braike 1  
D-73277 Owen  
Telefon +49 (0) 7021 573-0  
Telefax +49 (0) 7021 573-199  
info@leuze.de  
www.leuze.com

LEO-ZQM-149-04-FO

Leuze electronic GmbH + Co. KG, Sitz Owen, Registergericht Stuttgart, HRA 230712  
Persönlich haftende Gesellschafterin Leuze electronic Geschäftsführungs-GmbH,  
Sitz Owen, Registergericht Stuttgart, HRB 230550  
Geschäftsführer: Ulrich Balbach  
USt-IdNr. DE 145912521 | Zollnummer 2554232  
Es gelten ausschließlich unsere aktuellen Verkaufs- und Lieferbedingungen  
Only our current Terms and Conditions of Sale and Delivery shall apply


the **sensor** people

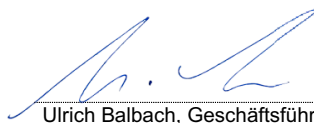
# EG-KONFORMITÄTS- ERKLÄRUNG (ORIGINAL)

# EC DECLARATION OF CONFORMITY (ORIGINAL)

# DECLARATION CE DE CONFORMITE (ORIGINAL)

Der Hersteller	The Manufacturer	Le constructeur
	<b>Leuze electronic GmbH + Co. KG</b> In der Braike 1, PO Box 1111 73277 Owen, Germany	
erklärt, dass die nachfolgend aufgeführten Produkte den einschlägigen Anforderungen der genannten EG-Richtlinien und Normen entsprechen.	declares that the following listed products fulfil the relevant provisions of the mentioned EC Directives and standards.	déclare que les produits identifiés suivants sont conformes aux directives CE et normes mentionnées.
Produktbeschreibung:	Description of product:	Description de produit:
<b>Einweg-Sicherheits-Lichtschranke, Berührungslos wirkende Schutzeinrichtung, Sicherheitsbauteil nach 2006/42/EG Anhang IV</b>  <b>SLS 96</b> <b>Seriennummer</b> <b>2010 01 A-Z 000001 - 999999</b>	<b>Protective throughbeam photoelectric sensor, Active opto-electronic protective device, safety component in acc. with 2006/42/EC annex IV</b> <b>SLS 96</b> <b>Serial no.</b> <b>2010 01 A-Z 000001 - 999999</b>	<b>Barrière unidirectionnelle, Équipement de protection électrosensible, Élément de sécurité selon 2006/42/CE annexe IV</b>  <b>SLS 96</b> <b>N° série</b> <b>2010 01 A-Z 000001 - 999999</b>
Angewandte EG-Richtlinie(n):	Applied EC Directive(s):	Directive(s) CE appliquées:
<b>2006/42/EG</b> <b>2004/108/EG</b>	<b>2006/42/EC</b> <b>2004/108/EC</b>	<b>2006/42/CE</b> <b>2004/108/CE</b>
Angewandte Normen:	Applied standards:	Normes appliquées:
<b>EN 61496-1:2004; IEC 61496-2:2006; EN ISO 13849-1:2009; EN 60947-5-2:2007</b>		
Benannte Stelle / Baumusterprüfbescheinigung:	Notified Body / Certificate of Type Examination:	Organisme notifié / Attestation d'examen CE de type:
<b>TÜV NORD CERT GmbH</b> <b>Benannte Stelle 0044</b> <b>Langemarckstr. 20</b> <b>45141 Essen</b>	/	<b>44 205 10 377326 003</b>
Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:	Authorized person to compile the technical file:	Personne autorisée à constituer le dossier technique:
<b>André Thieme; Leuze electronic GmbH + Co. KG</b> <b>Liebigstr. 4; 82256 Fuerstenfeldbruck; Germany</b>		

Owen, 02.09.2013  
Datum / Date / Date

  
Ulrich Balbach, Geschäftsführer / Director / Directeur

Leuze electronic GmbH + Co. KG  
In der Braike 1  
D-73277 Owen  
Telefon +49 (0) 7021 573-0  
Telefax +49 (0) 7021 573-199  
info@leuze.de  
www.leuze.com

Leuze electronic GmbH + Co. KG, Sitz Owen, Registergericht Stuttgart, HRA 230712  
Persönlich haftende Gesellschafterin Leuze electronic Geschäftsführungs-GmbH,  
Sitz Owen, Registergericht Stuttgart, HRB 230550  
Geschäftsführer: Ulrich Balbach, Dr. Matthias Kirchherr  
USt-IdNr. DE 145912521 | Zollnummer 2554232  
Es gelten ausschließlich unsere aktuellen Verkaufs- und Lieferbedingungen  
Only our current Terms and Conditions of Sale and Delivery shall apply

Nr. 609429-2013/09